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09/707,723	11/07/2000	Kazuyuki Sakakibara	CTW-006	9799

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT PAPER NUMBER

1745

DATE MAILED: 01/15/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/707,723

Applicant(s)

SAKAKIBARA ET AL.

Examiner

Susy N Tsang-Foster

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-24 is/are allowed.
- 6) ☒ Claim(s) 25-29, 41-45 and 57-61 is/are rejected.
- 7) ☒ Claim(s) 30-40, 46-56 and 62-72 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application):
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 10/22/2002. Claims 1, 6, 8, 13-15, 18, 23, and 24 have been amended. Claims 25-72 have been added. Claims 1-72 are pending in the application. Regarding claims 8-12, art rejections under 35 USC 102(b) based on EP 940864 A2 in the previous office action are withdrawn in view of applicants' amendment since EP 940864 A (Moore's reference) does not disclose, teach, or suggest a battery pack comprising a second case enclosing a first case that contains a plurality of cells. Rejections for claims 1 and 2 under 35 USC 102(a) based on EP 0994523 A1 are withdrawn in view of the translation of the foreign priority paper JP 11-321621 filed November 11, 1999 which supports the limitations of claims 1 and 2.

However, the translation of the foreign priority paper JP 11-321621 filed November 11, 1999 only supports the limitations of instant claims 1-7 and does not support the limitation "radiator means provided in the at least one air passage so as to be in contact with outer surfaces of the cells, the radiator means having portions each of which corresponds to at least one of the cells, wherein the portions have different heat capacities according to the heat load of the corresponding cell" recited in instant claims 8-72. The translation of foreign priority document JP 2000-293719 filed September 27, 2000 supports the limitations of instant claims 8-72. Therefore, instant claims 1-7 have the earliest priority date of November 11, 1999 and instant claims 8-72 have the earliest priority date of September 27, 2000.

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Claims 1-24 are allowed. Claims 30-40, 46-56, and 62-72 are objected to. Claims 25-29, 41-45, and 57-61 are finally rejected for reasons given below.

Specification

2. The disclosure is objected to because of the following informalities:

On page 4, the paragraph beginning at line 29 states that “the battery pack comprises one first cell group located generally in the center thereof and two second cell groups opposing the first cell group across branches of the at least one air passage.” However, as seen in Figures 12-13, the two second cell groups lie along the branches of the at least one air passage, not across the branches of the air passage.

Appropriate correction is required.

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: In claims 14, 30, 46, and 62, the limitation that the two second cell groups lie along the branches of the at least one air passage is not in the specification.

Claim Objections

4. Claims 26-28, 42-44, and 58-60 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

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Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 25 recites that the heat capacity of each portion of the radiator means is determined by the area of contact of the portion with the corresponding cell. However, dependent claims 26-28 do not appear to further limit claim 25 because they appear to recite alternative limitations each of a different scope as to how the heat capacity of each portion is determined.

Claim 41 recites that the heat capacity of each portion of the radiator means is determined by the thickness portion. However, dependent claims 42-44 appear to recite alternative limitations each of a different scope as to how the heat capacity of each portion is determined.

Claim 57 recites that the heat capacity of each portion of the radiator means is determined by the material of the portion. However, dependent claims 58-60 appear to recite alternative limitations each of a different scope as to how the heat capacity of each portion is determined.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 25-28, 41-44, and 57-60 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0940864 A2.

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With respect to claims 25, 41, and 57, EP 0940864 A2 discloses a battery pack comprising a case containing a plurality of cells 36 (See Figure 4a). A fluid passage must be present in the case to allow fluid outside of the case to enter the case and pass along the cells and exit from the case since an inlet 92 of the battery pack housing shown in Figure 4A enables the fluid to pass from a fan in a tool housing (for example, see cordless power tool 20 shown in Figure 1 attached to a battery pack 26) through the battery pack (see paragraph 38). In the reference, the fluid is the cooling air as evidenced by paragraphs 49 and 50 and Figure 13 where the terms fluid and air have been used interchangeably.

The cooling air entered through inlet 92 of the battery pack would exit the battery pack through ventilation slots 90 (See paragraph 38). A heat sink 84 is positioned between the cells for wicking the heat from the battery cells 36 (see Figure 4A). The heat sink 84 (the radiator means) has projecting portions 86 that surround the batteries to effectively move heat towards the fins 88 of the heat sink (see paragraph 37). The heat sink 84 may be a metallic sink with the projection portions 86 being metallic or a thermally conductive medium to extract heat from the cells to the heat sink (see paragraph 37). More fins as well as larger projecting portions surround battery cells which are known to have higher temperatures during charging of the battery as well as discharging when the cordless power tool is used (see paragraph 37) reads on the radiator means having portions which have different heat capacities according to the "heat conditions" of the corresponding cells in claims 25, 41, and 57.

With respect to claims 26, 41, and 59, since more fins as well as larger projecting portions surround battery cells which are known to have higher temperatures during charging of the battery as well as discharging, the heat capacity of the portion of the heat sink surrounding

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these battery cells is increased compared to other portions of the heat sink surrounding battery cells having lower temperatures and the thickness of the portion of the heat sink surrounding the higher temperature battery cells is thicker since there are more fins as well as larger projecting portions surrounding these battery cells. Furthermore, paragraph 11 of the reference states that the heat sink may include an increased concentration of material in areas having higher temperature cells which implies that these areas have thicker heat sink portions.

Furthermore, with respect to claims 25-28, 41-44, and 57-60, the heat capacity of each portion of the radiator means is inherently determined by the combination of the area of contact of the portion of the radiator means with the corresponding cell, the thickness of the portion, and the material of the portion.

7. Claims 25-29, 41-45, and 57-61 are rejected under 35 U.S.C. 102(a) as being anticipated by JP 2000-133225 A.

With respect to claims 25-28, 41-44, and 57-60, JP 2000-133225 discloses a battery pack comprising a plurality of battery cells 2 and a casing 1 and a radiator or radiator means comprising a plurality of regulation members 5 extending along the longitudinal direction of the secondary cells, and the plurality of regulation members form the passage of the cooling air between the peripheral sides of the battery cells (see claim 1 of machine translation). The battery case has an air intake duct 31 to allow cooling air outside the case to enter the case, pass along and between the cells, and exit from the case through exhaust port 42 (see paragraph 12 of machine translation and Figure 1). When the cooling air flows from the upstream side to the downstream side during heat exchange with the battery cells 2, the temperature of the air rises

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gradually (see paragraph 4 of machine translation). By gradually increasing the cross section of the regulation members 5 located in a line along the direction of flow of the air for cooling, the cross section of the passage of air is gradually decreased toward the downstream direction of the flow of cooling air and the rate of the air flow increases in the downstream direction and the heat transfer between the regulation members and the batteries in the downstream direction is increased (see paragraphs 16 and 17 of machine translation). Furthermore, gradually increasing the cross-sectional area of the regulation members 5 also inherently increases the heat capacity of the regulation members.

The heat capacity of each portion of the radiator means or radiator is inherently determined by the combination of the area of contact of the portion of the radiator means or radiator with the corresponding cell, the thickness of the portion, and the material of the portion.

With respects to claims 29, 45, and 61, the regulation members 5 includes a plurality of plates located at inner surfaces of the case that are in contact with one of the first and second cell groups, the first and second cell groups being the plurality of two battery cells arranged along the direction of air flow and since the temperature of the air increases in downstream direction of the air flow, the plurality of two battery cells located in the downstream direction would be hotter than the plurality of two battery cells in the upstream direction of the air flow if the radiator means or radiator was not present (see Figure 3).

Response to Arguments

8. Applicant's arguments filed 10/22/2002 have been fully considered but they are not persuasive.

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In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., varying the material, area of contact and thickness) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Specifically, regarding claim 25 and claims depending from claim 25, applicants assert on page 20 of the amendment that the Moores reference fails to disclose that the heat capacity of each portion of the radiator is adjusted by selecting the area of contact of the portion of the radiator with a corresponding cell. However, claim 25 does not recite that the heat capacity of each portion of the radiator is varied by varying the area of contact of the portion of the radiator with a corresponding cell. Instead, claim 25 recites that the heat capacity of each portion of the radiator means is determined by the area of contact of the portion with the corresponding cell. It is the Examiner's position that the heat capacity of each portion of the radiator means inherently depends on the area of contact of the portion with the corresponding cell.

With regards to claim 41 and claims depending from claim 41, applicants assert on page 21 of the amendment that the Moores reference fails to disclose that the heat capacity of each portion of the radiator is adjusted by selecting the thickness of the portion of the radiator with a corresponding cell. However, claim 41 does not recite that the heat capacity of each portion of the radiator is varied by varying the thickness of the portion of the radiator with a corresponding cell. Instead, claim 41 recites that the heat capacity of each portion of the radiator means is determined by the thickness of the portion with the corresponding cell. It is the Examiner's

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position that the heat capacity of each portion of the radiator means inherently depends on the thickness of the portion with the corresponding cell.

Nevertheless, the Moores reference does disclose varying the thickness of each portion of the radiator means depending on the heat condition on the corresponding cell in paragraph 37 which states that more fins as well as larger projecting portions surround battery cells which are known to have higher temperatures during charging of the battery as well as discharging when the cordless power tool is used. Furthermore, paragraph 11 of the reference states that the heat sink may include an increased concentration of material in areas having higher temperature cells which implies that these areas have thicker heat sink portions.

Finally, with regards to claim 57 and claims depending from claim 57, applicants assert on page 21 of the amendment that the Moores reference fails to disclose that the heat capacity of each portion of the radiator is adjusted by selecting the material of the portion of the radiator with a corresponding cell. However, claim 57 does not recite that the heat capacity of each portion of the radiator is varied by varying the material of the portion of the radiator with a corresponding cell. Instead, claim 57 recites that the heat capacity of each portion of the radiator means is determined by the material of the portion of the radiator with the corresponding cell. It is the Examiner's position that the heat capacity of each portion of the radiator means inherently depends on the material of the portion with the corresponding cell.

Allowable Subject Matter

9. Claims 1-24 are allowed.

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10. Claims 30-40, 46-56, and 62-72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

The present invention claims a battery pack with the distinguishing feature of at least one radiator provided in at least one air passage formed within the case of the battery pack that is in contact with one or more outer surfaces of the cells in the battery pack, the heat capacity of the at least one radiator increases in the downstream direction of a flow of the cooling air (claims 1-7).

The closest prior art of record, EP 940864 A2 discloses a battery pack comprising radiator means having a plurality of portions each corresponding to each of the cells where the portions have different heat capacities according to a heat load of the corresponding cell but does not disclose, teach, or suggest that the heat capacity of the at least one radiator increases in the downstream direction of a flow of cooling air.

The present invention also claims a battery pack having at least one air passage formed within the case to allow cooling air outside the case to enter the case, and to pass at least one of along and between the cells and exit the case, radiator means provided in the at least one air passage to be in contact with the outer surfaces of the cells, the radiator means having portions in contact with the corresponding cells, wherein the portions have different heat capacities, and the cells are divided into a first cell group located in the center of the battery pack and two second

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cell groups along the branches of the at least one air passage, the first cell group interposing the two second cell groups, and the radiator means includes a plurality of radiator plates having different heat capacities, each radiator plate being in contact with one of the first and second cell groups (applies to claims 30-40, 46-56, and 62-72).

The closest prior art of record, JP 2000-133225 A discloses a battery pack comprising a radiator means provided in at least one air passage of the battery pack, the radiator means comprising a plurality of regulation members lying along the direction of flow of the air for cooling that gradually increases in cross sectional area in the downstream direction of the airflow but does not disclose, teach, or suggest that the battery pack comprises a first cell group located generally in the center of the battery pack and two second cell groups along the branches of the least one air passage and the first cell group interposes the two second cell groups (applies to claims 30-40, 46-56, and 62-72). Instead, JP 2000-133225 A discloses passing air in a direction perpendicular to the longitudinal direction of the batteries (see claim 1 of machine translation and Figures 1-3).

Finally, the present invention also claims a battery pack comprising a first case containing a plurality of cells, a second case enclosing the first case, at least one air passage formed within the first case for allowing cooling air outside the first case to enter the first case at an upstream portion of the at least one air passage and to pass at least one of along and between the cells and exit from the first case at a downstream portion of the at least one air passage, and radiator means provided in the at least one air passage so as to be in contact with an outer surface

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of each of the cells and the radiator means having a plurality of portions each corresponding to each of the cells, and the portions have different heat capacities according to a heat load of the corresponding cell (applies to claims 8-24).

The closest prior art of record, EP 940864 A2 discloses a battery pack having at least one air passage formed within the case to allow cooling air outside the case to enter the case, and to pass at least one of along and between the cells and exit the case, radiator means provided in the at least one air passage to be in contact with the outer surfaces of the cells, the radiator means having portions in contact with the corresponding cells, wherein the portions have different heat capacities but does not disclose, teach, or suggest a first case containing the plurality of cells of the battery pack and a second case enclosing the first case and the at least one air passage is formed within the first case for allowing cooling air outside the first case to enter the first case at an upstream portion of the at least one air passage and to pass at least one of along and between the cells and exit from the first case at a downstream portion of the at least one air passage (applies to claims 8-24).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Thursday from 9:30 AM to 8:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9310 for regular communications and (703) 872-9311 for After-Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/11 January 2003


Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700